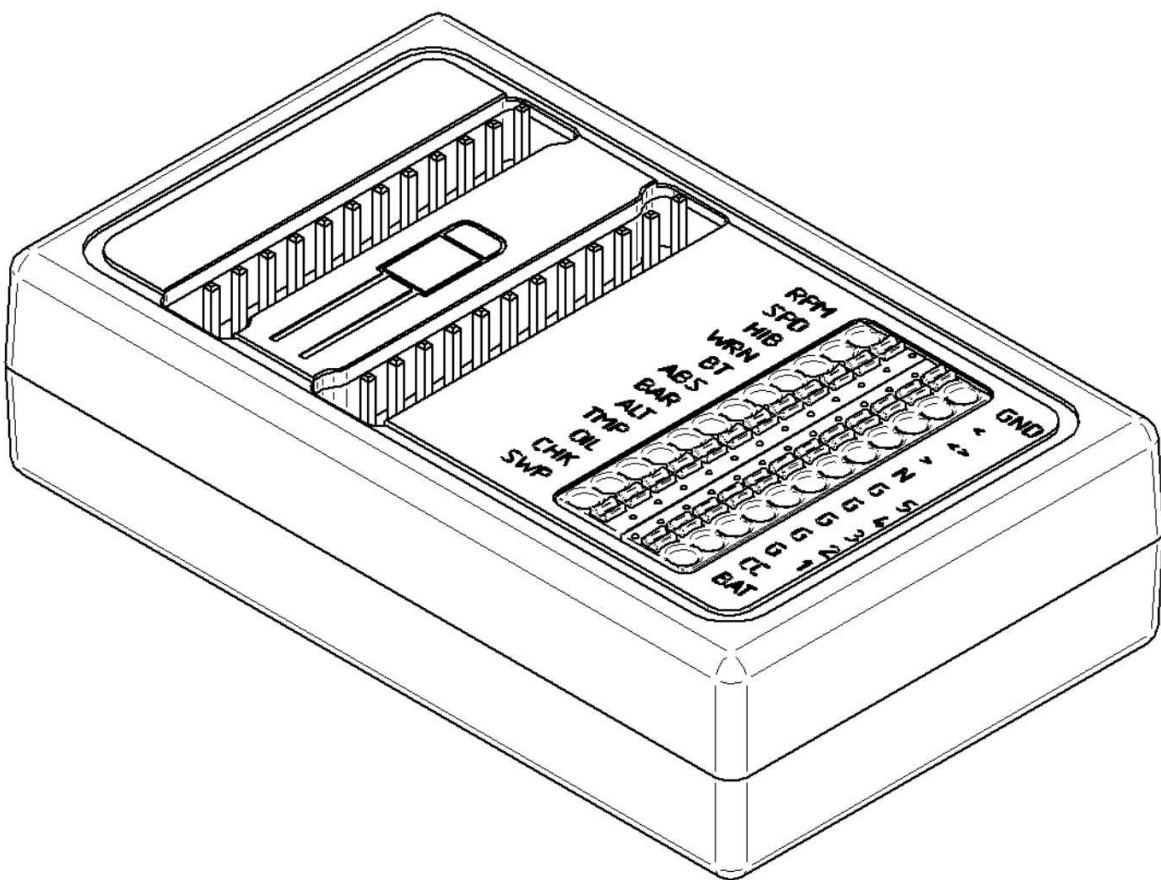




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BEP3.0 Operating manual





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1.0 Legal framework

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In Switzerland, the operation of the BEP 3.0 is allowed only on the private grounds, since the BEP3.0 is not permitted for the Swiss road traffic. No statement can be made on the use of the BEP3.0 abroad.

1.1 Compatible motorcycles

The BEP2.0 had initially been developed for those who were looking to replace the original cockpit (also labeled „Brotbox“ in German-> “Lunch Box”) of their K with a speedometer of a third-party manufacturer. And everything done completely stress-free without soldering and tangled wires. No alterations to the wiring harness or modifications of the vehicle are required. Simply plug in and off you go! The following motorcycles are supported:

- 1983-1987 K 100 (Series I)
- 1983-1989 K 100 RS
- 1984-1988 K 100 RT
- 1986-1991 K 100 LT
- 1987-1990 K 100 (Series II)
- 1988-1993 K 1
- 1990-1992 K 100 RS 4V
- 1991-1997 K 1100 LT
- 1992-1996 K 1100 RS
- 1985-1990 K 75 C
- 1985-1995 K 75 C
- 1986-1996 K 75 Basis
- 1989-1996 K 75 RT



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1.2 Functions

If you disassemble the lunch box, the following functions are no longer available:

- the battery is not being charged
- the start button does not operate (if so then only with the clutch pulled)
- idle signal is not accessible at the wiring harness
- the speed signal from the final drive is not usable.
- the reserve signal at 4L can not be used
- automatic turn signal resetting is without function

The lunch box is therefore not only a display instrument, but it also decodes signals (BCD code from the transmission switch code), amplifies signals (the speedometer signal from the final drive is amplified via an OP-amp) compares signals (via a comparator the reserve signal is triggered at 4L) and sends out signals itself (the enableplus on the start button when the idling speed is inserted).

The BEP can handle all of these tasks in a small circuit.

Note 1: Since the K had until 1986 no floater in the tank, but only about 2 NTC sensors signal levels for 4 and 7 liters of the fuel capacity, the bar indicator for the filling level can not be used on the motorcycles with such a tank. Therefore, the BEP3.0 simulates a signal for the bar display of the accessory tachos (speedometers) in these motorcycles. If the tank is more than 4 liters, **Full** will show up. If it is less than 4 liters, **Empty** will appear.

If your K has a floater, there is the connection for the original BMW level indicator under the tank. This is a white four-wire plug (green, violet, yellow and grey). The level signal is applied to the YELLOW ADAPTER. The sensor is a 0/100Ohm type.



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1.3 Inputs and outputs

1.3.1 Inputs

The BEP3.0 has 24 inputs (on the drawing below on the LEFT side). If you are interested in the exact betting of the individual Inputs, you can read about it in the technic section of www.FlyingBrick.de or [HERE](#). For the function of the BEP3.0 it is only decisive that the wiring harness plug is plugged in properly. Top left there is Pin1 (steady plus). Everything else is done by itself.

ATTENTION! Unfortunately, BMW didn't design the wiring harness plug to be "twist-proof". Therefore it is possible to plug in the connector upside down. In this case, the fuse 15 would switch on immediately along with the ignition (ignition plus PIN6 would then be connected to ground PIN18). Neither the BEP3.0 nor the K should be affected by that. However, please make sure to insert the plug properly. The wiring harness should go down (as in the engraving on the BEP).



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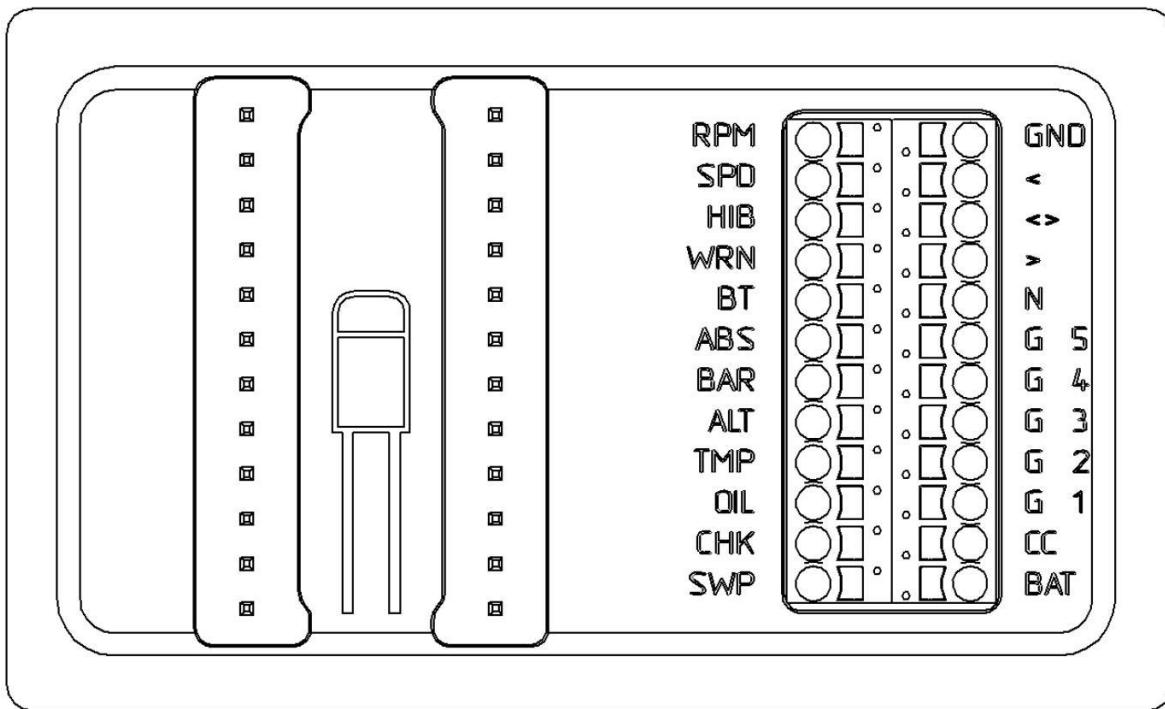
1.3.2 Outputs

The BEP2.0 has 24 outputs (on the drawing below on the RIGHT side). I have installed here WAGO terminal blocks, which (as opposed to the screw-type panels) are vibration-resistant. The wires can be simply plugged in and then they clamp firmly there. Simply press the white buttons with a screwdriver and the clamping mechanism opens. The Wago's work with 0.08mm² to 2.5mm² line cross-section.

BMW-connector / BEP3.0 Eingang			WAGO-connector / BEP3.0 AUSGANG	
Kabelfarbe	PIN	Beschreibung	WAGO	Beschreibung
[Red]	1	+ Dauerplus	BAT	+ Dauerplus
[Yellow]	2	Getriebeschalter 2^2	CC	+ Stromquelle für Ganganzeige
[Yellow]	3	Getriebeschalter 2^1	G 1	- Gang 1
[Yellow]	4	Getriebeschalter 2^0	G 2	- Gang 2
[Green]	5	Freigabesignal für Startknopf	G 3	- Gang 3
[Green]	6	Zündungsplus	G 4	- Gang 4
[White]	7	Reserve / NTC	G 5	- Gang 5
[Blue]	8	ABS	N	- Neutral
[Purple]	9	LIMA	>	+ Blinker rechts
[Brown]	10	Thermostat	< >	+ Blinker zusammen (nicht Warnblinker)
[Brown]	11	Öldruckschalter	<	+ Blinker links
[Purple]	12	Choke	GND	- Masse
[Brown]	13	Masse	SWP	+ Zündungsplus
[Blue]	14	BMW Lampenkontrollgerät	CHK	- Choke
[White]	15	Fernlicht	OIL	- Öldruck
[Black]	16	Zündsignal	TMP	- Motortemperatur
[Blue]	17	Blinker rechts	ALT	- Lichtmaschine
[Brown]	18	Masse	BAR	Balkenanzeige Tankinhalt (für alten NTC bis Bj.1986)
[Red]	19	Blinker links	ABS	+ ABS
	20	nicht angeschlossen	BT	- Lampenkontrolltest
[Green/Blue]	21	automatische Blinkerrückstellung	WRN	- Warnleuchte
[Yellow]	22	Induktivgeber Endantrieb	HIB	+ Fernlicht
[Brown]	23	Masse	SPD	Geschwindigkeit
[Blue]	24	Tachobeleuchtung	RPM	Entstörte Drehzahl (Tachoeinstellung 1:1)



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The outputs are to be wired as follows:

Signal Name Description Signal Name Description.

<input type="checkbox"/>	RPM Rotation speed	-	GND Ground
<input type="checkbox"/>	SPD speed	+	< blinker left
+	HIB High beam	+	<> blinker combined Left / Right
-	WRN collective warning lamp	+	> blinker right
-	BT Lamp test	-	N Neutral display
+	ABS anti - lock braking system	-	G 5 gear 5
	BAR Bargraph for old tank	-	G 4 gear 4
-	ALT Charging indicator light	-	G 3 gear 3
-	TMP Cooling water temperature	-	G 2 gear 2
-	OIL oil temperature	-	G 1 gear 1
-	CHK Choke	+	CC Power source gear indicator
+	SWP Ignition	+	BAT steady plus

- RPM and SPD is output as a square wave signal, which means that the rotary pulses from the crankshaft or the rear wheel respectively, are changed in a changing frequency of low and high Pulses.



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Explanatory notes:

- RPM	rotational speed	suppressed and averaged between 0 - 9 V
- SPD	speed	amplified and adjustable between 0 - 5V or 0 - 12V
- HIB	high beam	switches to 12 V as soon as the high beam is switched on.
- WRN	warning lamp	summarizes the following warnings: BT, ABS, ALT, TMP,OIL, CHK Individual errors are separated from each other by blocking diodes.
- BT	lamp test	goes out only when both brakes are pulled once and the taillight is intact (does not work together with LED taillight) Since LED consumes only very little current, it is detected as a defect)
- ABS	anti-lock braking system	(signal is looped unchanged) (12 V)
- BAR	Bar indicator	of old tank with 4/7 liters display (bar indicator shows over 4 liters Full, from 4 liters tank capacity - empty) 10 - 100 Ohm
- ALT	charge indicator control	for starting the engine, the engine must be rotated over approx. 1200 rpm, afterwards board voltage is applied)
- TMP	cooling water temp.	switches to ground when the cooling water sensor is activated
- OIL	oil pressure warning lamp	switches to ground when the oil pressure sensor is activated
- CHK	Choke Display	switches to ground when the choke is inserted
- SWP	Ignition Plus	switched on the accessory speedometer (battery voltage)
- GND Ground		
- <	Blinker Left	Turns 12 V Pulses when blinking to the left
- <>	Sampling lamp	switches 12 V Pulses when blinking (direction-independent)
- >	Blinker Right	switches 12 V Pulses when blinking to the right
- N	Idle display	switches to ground when idle is engaged
- G1 - G5	Gear indicator	switches to ground when the gear is engaged
- CC	Constant current source	for the gear display (12V 12mA)
- BAT	steady plus	(battery voltage)

1.4 Compatibility

In principle, most accessories should work with the BEP3.0. Understandably, we cannot periodically purchase all accessory speedometers and check their compatibility. Currently there is a cooperation with Acewell, whereby the BEP3.0 gives Acewell speedometers complete and unrestricted support.

Speedometers with some known limitations:

- Louis T & T speedometer small version with analogue speed indicator
 - > Neutral indicator and warning lamp without function
- Motogadget Tiny
 - > Phantom speed at idle speed
 - > with included functioning speed sensor
- Koso DB01
 - > Neutral display without function (neutral switches to 12V)



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1.5 A checklist for a correctly installed speedometer

The following checklist can be used to check whether the BEP3.0 and the speedometer are connected correctly.

1. Switch on ignition

- All the lamps on the speedometer light up, the pointer turns once to the Full extent and then back to 0
- When idle speed is inserted, the neutral lamp is lit
- Warning lamp is on

2. Starting the engine

- Warning lamp goes out (if choke is not inserted) or The engine must be possibly briefly brought to approx. 1500 rpm so that the alternator is ignited
- Speed and speedometer display 0 and don't wriggle or jump

3. Rotating of the engine

- Speed display turns up and does not wriggle
- When the gear is engaged - the speed is high and doesn't wriggle (Be careful the rear wheel can rotate freely)

4. flashing

- When the turn signal is activated, the corresponding turn signal light is lit.

5. ABS

- ABS is flashing until start-up (self-test of the ABS system)